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EXAMINER	
HOLDER, ANNER N	

ART UNIT	PAPER NUMBER
2621	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/811,982	PURI ET AL.	
	Examiner	Art Unit	
	ANNER HOLDER	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/28/07; 01/25/06; 07/08/05; 11/22/04; 07/29/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 5 and 6 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 5 and 6 recites "selectively canceling" which is not disclosed in the specification.

3. Claims 17-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 17-19 recites "the clipper" which is not disclosed in the specification.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-4 and 8-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hui US 6,654,417 B1 in view of Chiang et al. (Chiang), A new rate Control Scheme Using Quadratic Rate Distortion Model, IEEE, 1996, pgs. 73-76.

6. As to claim 1, Hui teaches determining a target bitrate for a picture in the sequence based on the picture's complexity, [Fig. 2 (222); Fig. 3 (322)] generating a first quantizer estimate for the picture based on a fullness indicator from a transmit buffer of a video coder, [Col. 9 lines 31-34] generating a second quantizer estimate for the picture of quantizer assignments made to prior pictures of a same type, actual coding rates achieved by such quantizer assignments and the target bitrate, [Col. 9 lines 38-43] and selecting a quantizer based on a difference between the two quantizer estimates and based on the picture's complexity. [Col. 3 lines 64-65; Fig. 3 (306, 312-322); Fig. 2 (206, 212-222); Col. 12 lines 24-33]

Hui is silent as to the use of linear regression regarding a quantizer.

Chiang teaches linear regression in determining a quanizer value. [Abstract; 1. Introduction ¶ 1; 5. Rate Control for the MPEG-4 Coder]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the linear regression teachings of Chiang with the device of Hui improving image quality and coding efficiency.

7. As to claim 2, Hui (modified by Chiang) teaches the picture's complexity is determined by analyzing spatial complexity within the picture. [Hui - Col. 6 lines 9-19; Col. 12 lines 18-22]

8. As to claim 3, Hui (modified by Chiang) teaches the picture's complexity is determined by analyzing motion complexity of the picture with respect to previously coded pictures. [Hui - Fig. 2; Fig. 3; Col. 6 lines 9-19]

9. As to claim 4, Hui (modified by Chiang) teaches the picture's complexity is determined by analyzing a number of bits used to represent each pixel in the picture. [Hui - Col. 4 lines 16-31]

10. As to claim 8, Hui (modified by Chiang) teaches selecting a coding mode for blocks of the picture according to a rate control policy selected for the picture. [Hui - Col. 5 lines 58-67]

11. As to claim 9, Hui (modified by Chiang) teaches the target bitrate is determined based on a number of bits (R) allocated to represent a group of pictures to which the picture belongs, a number (N) of like-kind pictures that will occur in the group of pictures. [Hui - Fig. 2; Fig. 3; Col. 11 lines 1-24; Col. 12 lines 24-33]

12. As to claim 10, Hui (modified by Chiang) teaches when the picture is an I picture, the target bitrate T.sub.i is determined by: T i = max [R (1 + N P X P X I K P + N B X B X I K B) , bitrate 8 * picturerate] , where R represents a number of bits allocated to code a group of pictures in which the I picture resides, N.sub.P and N.sub.B respectively represent the number of P and B pictures that appear in a group of frames, X.sub.I and X.sub.P respectively represent complexity estimates for the I and P pictures in the group of frames, K.sub.P is a constant, K.sub.B is determined based on the complexity indicators, bitrate represents the number of bits allocated for coding of the group of pictures, and picturerate represents the number of pictures in the group of pictures. [Hui - Col. 6 line 55- Col. 7 line 5; Col. 11 lines 40-60]

13. As to claim 11, Hui (modified by Chiang) teaches when the picture is a P picture, the target bitrate T.sub.p is determined by: T P = max [R (N P + N B K P X B K B X P) , bitrate 8 * picturerate] , where R represents a number of bits allocated to code a group of pictures in which the P picture resides, N.sub.P and N.sub.B respectively represent the number of P and B

pictures that appear in a group of frames, X.sub.I and X.sub.P respectively represent complexity estimates for the I and P pictures in the group of frames, K.sub.P is a constant, K.sub.B is determined based on the complexity indicators, bitrate represents the number of bits allocated for coding of the group of pictures, and picturerate represents the number of pictures in the group of pictures. [Hui - Col. 6 line 55- Col. 7 line 5; Col. 11 lines 40-65]

14. As to claim 12, Hui (modified by Chiang) teaches when the picture is a B picture, the target bitrate T.sub.b is determined by: 16 T B = max [R (N B + N P K B X P K P X B) , bitrate 8 * picturerate] , where N.sub.P and N.sub.B respectively represent the number of P and B pictures that appear in a group of frames, X.sub.I and X.sub.P respectively represent complexity estimates for the I and P pictures in the group of frames, K.sub.P is a constant, K.sub.B is determined based on the complexity indicators, bitrate represents the number of bits allocated for coding of the group of pictures, and picturerate represents the number of pictures in the group of pictures. [Hui - Col. 6 line 55- Col. 7 line 5; Col. 11 lines 10-65]

15. As to claim 13, Hui (modified by Chiang) teaches when the picture is an I picture, the linear regression is performed using predetermined assumed values for the prior quantizer assignments and actual coding rates. [Chiang - Abstract; 1. Introduction ¶ 1; 5. Rate Control for the MPEG-4 Coder]

16. As to claim 14, Hui (modified by Chiang) teaches when the picture is an P picture, the linear regression is performed using quantizer assignments and actual coding rates for three prior P pictures. [Chiang - Abstract; 1. Introduction ¶ 1; 5. Rate Control for the MPEG-4 Coder]

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

18. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hui US 6,654,417 B1 in view of Chiang et al. (Chiang), A new rate Control Scheme Using Quadratic Rate Distortion Model, IEEE, 1996, pgs. 73-76 further in view Vogel US 5,343,247.

19. As to claim 5, Hui (modified by Chiang) teaches limitations of claim 1.

Hui is silent as to selectively canceling transform coefficients of coded blocks in the picture according to a rate control policy selected for the picture.

Vogel teaches selectively canceling transform coefficients of coded blocks in the picture according to a rate control policy selected for the picture. [Fig. 2; Fig. 3; Col. 3 lines 61-63]

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the device of Hui modified by Chiang to improve image quality.

20. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hui US 6,654,417 B1 in view of Chiang et al. (Chiang), A new rate Control Scheme Using Quadratic Rate Distortion Model, IEEE, 1996, pgs. 73-76 further in view Suzuki US 6,937,656 B2.

21. As to claim 6, Hui (modified by Chiang) teaches the limitations of claim 1.

Hui is silent as to selectively canceling motion vectors of coded blocks in the picture according to a rate control policy selected for the picture.

Suzuki teaches selectively canceling motion vectors of coded blocks in the picture according to a rate control policy selected for the picture. [Col. 9 lines 14-19]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Suzuki with the device of Hui modified by Chiang to improve coding efficiency.

22. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsia US 2004/0146108 A1 in view of Chiang et al. (Chiang), A new rate Control Scheme Using Quadratic Rate Distortion Model, IEEE, 1996, pgs. 73-76 and further in view of Sugiyama US 6,940,911 B2.

23. As to claim 7, Hui (modified by Chiang) teaches the limitations of claim 1.

Hui (modified by Chiang) is silent as to decimating pictures within the video sequence according to a rate control policy selected for the picture.

Sugiyama teaches decimating pictures within the video sequence according to a rate control policy selected for the picture. [Fig. 7; Fig. 11; Fig. 14; Col. 15 lines 10-19, 61-67; Col. 16 lines 3-7]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Sugiyama with the device of Hui modified by Chiang allowing for improving the image quality.

24. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsia US 2004/0146108 A1 in view of Chiang et al. (Chiang), A new rate Control Scheme Using Quadratic Rate Distortion Model, IEEE, 1996, pgs. 73-76.

25. As to claim 15, Hsia teaches a scene content analyzer having an input for source video data and an output for complexity indicators representing complexity of each picture in the source video data, a first quantizer estimator [Abstract; Fig. 3 (Scene Detection Module, Quantization Decision Module, and Picture Type Decision Module); Pg. 4-5 ¶ 0045-0046] having an input for the source video data and complexity indicators, to generate a quantizer estimate of a picture based on a calculation of a target rate for coding the picture, [Fig. 3 (Quantization Decision Module); Abstract; Pg. 0044] a second quantizer estimator having an input for the complexity indicators and past values of quantizer selections and coding rates achieved therefrom, the second quantizer estimator to generate a second quantizer estimate for the picture based on a prior quantizer selections and coding rates for like-kind pictures, [Fig. 3 (Quantization Decision Module)] and a coding adapter, having inputs for the two quantizer estimates and the complexity indicators to select a quantizer for the picture based on a difference of the two quantizer estimates. [Abstract; Fig. 3 (Scene Detection Module, Quantization Decision Module, and Picture Type Decision Module); Pg. 4-5 ¶ 0045-0046]

Hsia is silent as to linear regression modeling quantization.

Chiang teaches linear regression modeling quantization. [Abstract; 1. Introduction ¶ 1; 5. Rate Control for the MPEG-4 Coder]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the linear regression teachings of Chiang with the device of Hsia improving image quality and coding efficiency.

26. As to claim 16, Hsia (modified by Chiang) teaches the coding adapter comprises a subtractor having inputs for the two quantizer estimates. [Hsia - Abstract; Fig. 3 (Scene Detection Module – Scene Change Detection); Pg. 4-5 ¶ 0044-0046]

27. Claims 17-19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsia US 2004/0146108 A1 in view of Chiang et al. (Chiang), A new rate Control Scheme Using Quadratic Rate Distortion Model, IEEE, 1996, pgs. 73-76 and further in view of Mitchell et al. (Mitchell) US 6,256,422 B1.

28. As to claim 17, Hsia (modified by Chiang) teaches a subtractor having inputs for the two quantizer estimates. [Fig. 3 (Scene Detection Module); Pg. 4-5 ¶ 0045]

Hsia (modified by Chiang) is silent as to a clipper coupled to an output of the subtractor.

Mitchell teaches a clipper coupled to an output of the subtractor. [Fig. 11(a); Col. 13 lines 28-61]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the clipper teachings of Mitchell with the device of Hsia modified by Chiang to allow for removal of errors within an allowed range. [Mitchell - Abstract]

29. As to claim 19, Hsia (modified by Chiang and Mitchell) teaches a subtractor having a first input coupled to the output of the clipper and a second input for a value of a quantizer of a previously processed picture. [Fig. 11(a); Col. 13 lines 28-61; Hsia – Fig. 3 (Mode Decision Mode)]

30. As to claim 20, Hsia (modified by Chiang and Mitchell) teaches the coding adapter comprises a lookup table indexed by a complexity indicator representing complexity of the picture and the picture's coding type. [Mitchell - Col. 6 lines 26-34]

31. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsia US 2004/0146108 A1 in view of Chiang et al. (Chiang), A new rate Control Scheme Using Quadratic Rate Distortion Model, IEEE, 1996, pgs. 73-76, in view of Mitchell et al. (Mitchell) US 6,256,422 B1and further in view of Hui US 6,654,417 B1.

32. As to claim 18, Hsia (modified by Chiang and Mitchell) teaches the limitations of claim 17.

Hui teaches a divider. [Fig. 2; Col. 48-51]

It would have been obvious to one of ordinary skill at the time the invention was made to combine the teachings of improving image quality.

33. Claims 21-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hui US 6,654,417 B1 in view of Hsia US 2004/0146108 A1.

34. As to claim 21, Hui teaches for a plurality of macroblocks of an input picture, computing variances of a plurality of blocks therein, comparing minimum variance values of the plurality of macroblocks to corresponding minimum variance values of macroblocks from a prior picture, [Fig. 2 (202, 203); Fig. 3 (303, 302); Col. 8lines 50-51; Col. 8 line 66 - Col. 9 line 3; Col. 12 lines 18-23] calculating an activity level of the input picture from the variances, comparing the activity level of the input picture to an activity level of the prior picture. [Fig. 2 (202, 216, 217); Fig. 3 (302, 316, 317); Col. 9 lines 38-47; Col. 12 lines 24-33]

Hui is silent as to the generation of a scene change decision.

Hsia teaches generating a scene change decision . [Fig. 3 (Scene Detection Module); Pg. 4-5 ¶ 0045]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Hsia with the device of Hui improving image quality and coding efficiency.

35. As to claim 22, Hui (modified by Hsia) teaches averaging the minimum variance values of each macroblock in the input picture, averaging minimum variance values of each macroblock in the prior picture, and comparing the average minimum variance values of the input picture to the average minimum variance values of the prior picture. [Hui - Fig. 3; Fig. 2; Col. 9 lines 38-47; Col. 12 lines 24-33; Hsia - Fig. 3; Pg. 4-5 ¶ 0044-0046]

36. As to claim 23, Hui (modified by Hsia) teaches averaging the minimum variance values of each macroblock in the input picture, averaging minimum variance values of each macroblock in the prior picture, normalizing each of the average minimum variance values, [Hui – Fig. 2 (216, 217); Fig. 3 (316, 317); Col. 9 lines 37-47; Col. 12 lines 24-33] and determining a ratio between the normalized values of the input picture to the normalized values of the prior picture, and comparing the ratio to a predetermined threshold. [Hui - Col. 6 line 60 - Col. 7 line 41, equation within cited portion of shows the use of the activity ratio; Col. 9 lines 37-47

37. As to claim 24, Hui (modified by Hsia) teaches averaging variances of all blocks in the picture, and comparing the average variance value to the average minimum variance value for the picture. [Hui – Fig. 2 (216, 217); Fig. 3 (316, 317); Col. 9 lines 37-47; Col. 12 lines 24-33]

38. As to claim 25, Hui (modified by Hsia) teaches the comparison of activity levels comprises: determining a ratio between the activity level of the input picture and the activity level of the prior picture, and comparing the ratio to a predetermined threshold. [Hui - Col. 6 line

60 - Col. 7 line 41, equation within cited portion of shows the use of the activity ratio; Col. 9 lines 37-47]

39. As to claim 26, Hui (modified by Hsia) teaches normalizing activity levels for the input picture, normalizing activity levels for the prior picture, and comparing the normalized activity levels to each other. [Hui – Fig. 2 (216, 217); Fig. 3 (316, 317); Col. 9 lines 37-47; Col. 12 lines 24-33]

40. As to claim 27, Hui teaches variance calculator to calculate a plurality of variance values for each macroblock in a source image, Fig. 2 (202, 203); Fig. 3 (303, 302); Col. 8lines 50-51; Col. 8 line 66 - Col. 9 line 3; Col. 12 lines 18-23] a minimum variance selector to select a minimum variance value for each macroblock, [a memory to store minimum variance values of a previously processed image, [Fig. 2(201); Fig. 3(301)] a comparator to compare the minimum variance values of the source image to the minimum variance values of the previously processed image, an averager to calculate an average variance value for each macroblock, an activity calculate to calculate an activity level of the source image from the average variance values. [Fig. 2 (216); Fig. 3 (316)]

Hui is silent as to decision logic to signal that the scene change based on a comparison of an output from the comparator and the activity level of the source image.

Hsia teaches decision logic to signal that the scene change based on a comparison of an output from the comparator and the activity level of the source image. [Fig. 3 - Picture Decision Module]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Hsia with the device of Hui improving image quality and coding efficiency.

Conclusion

41. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANNER HOLDER whose telephone number is (571)270-1549. The examiner can normally be reached on M-Th, M-F 8 am - 3 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ANH 03/11/08

/Tung Vo/
Primary Examiner, Art Unit 2621